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MINIMUM TILLAGE
QUESTIONS AND ANSWERS

By Delbert E. Lane
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What Is Minimum Tillage?

Minimum tillage is simplified tillage that reduces or combines field operations.

What Are the Costs Per Acre of Minimum Tillage?

Costs may range from 5 to 15 dollars per acre less than for the usual methods of planting. This is accomplished by reducing the number of field operations.

How Much Work Does Minimum Tillage Save?

The till-plant method can cut field time in half by combining tillage, seed-bed preparation and planting.

What Are Energy Requirements of Minimum Tillage?

The energy requirement is about one-half that of conventional tillage.

What Size Tractor Is Needed for Minimum Tillage?

A 3-4 plow tractor handles the till-planter easily at 3.5 to 5 mph.

With other minimum tillage methods, using machinery already on the farm, your tractor will do the job. The farm machines will require less power than normal since some of them will not be operated in the usual way.

How Many Minimum Tillage Methods Are Used in Nebraska?

Till-plant

Rotary moldboard mounted lister used as surface planter

Sweep and surface plant

Disk and surface plant

List

The till-plant is the only method recommended at this time.

What Is the Difference Between These Methods of Minimum Tillage?

The till-planter tills, makes the seedbed, applies chemicals and plants seed in one operation.

The rotary moldboard lister point loosens the soil for covering the seed. The rotary moldboards are set low to move the trash, clearing the row for planting. It pushes a small amount of soil and the trash over to have a leveling effect. The stalks should be cut before the rotary moldboard is used.

The sweep machine knocks off the top of the ridge and moves the trash, clearing the row for planting. Trash guards may be required on this machine. The surface planter plants in the cleared row.

The disk knocks down the stalks, does some leveling before planting the seed with the surface planter. Disking should be done parallel to the old rows.

The listing operations are done in the usual way.

The rotary moldboard lister, the sweep planter and the till-planter all plant in the old row for best results.

Should the Ground Be Worked Before Planting?

Yes, the planting methods using the surface planter need some ground preparation before planting.

No, the till-planter and the rotary moldboard lister need no tillage before they are used.

What About Soil Compaction?

Any field in the spring is firm but not compacted. The water intake on this type of field is better than on soil that has been worked in the spring. More field operations than are necessary may aggravate a compaction problem below tillage depth. Natural forces of wetting and drying, freezing and thawing will keep the soil in condition.

Can Minimum Tillage Be Used on Any Soil?

Observations on sandy soils in western Nebraska and on heavier soils in eastern Nebraska indicate that minimum tillage is good for all soil types.

What About Erosion?

Minimum tillage shows good control for both wind and water erosion. The stalks left on the surface break the force of the wind and water so that the soil does not blow away by wind or seal over from water.

Will Stalks Carry Over to the Next Year and Build Up?

Results indicate that in a normal year the stalks will decay by harvest time under dryland conditions. There is no problem with stalk build-up on irrigated crops since high fertility levels and plenty of moisture aid decay.

Does Minimum Tillage Work on Crop Residues Other Than Corn?

Minimum tillage has been used in wheat stubble in Nebraska. The stubble was one-wayed about an inch deep to control volunteer wheat. The corn was planted in the stubble of a 40-bushel to the acre wheat crop. Corn made 65 bushels per acre on dryland with an 18-inch drop. Other areas have used minimum tillage in other residues with good results.

What Machines Can Be Used for Minimum Tillage?

The rotary moldboard mounted lister seems to work well as a surface planter except it is more difficult to control at shallow operating depths.

The sweep machine and surface planter should do the same job as the rotary moldboard. The sweep should have trash guards to move trash from the row. Sweeps are run down the old row and the seed should be planted in the old row.

The disk and the surface planter have been used but it is more difficult to get a clean row. Stand may be a problem and in some years there may be a drop in yield.

The lister has been used for many years. In some years it is difficult to get a stand.

The stalk cutter should be used ahead of the till-planter, the sweep machine, and the rotary moldboard lister.

Which Machines Are Best for Minimum Tillage?

The till-planter has proven to be very good for planting corn. Stands are as good or better than with conventional planting. Weeds are fewer in number. Plants are healthy and vigorous.

The sweep machine and surface or the rotary moldboard can do a good job when operated properly.

Should We Use a Plow and Disk?

Power and labor requirements are high for the plow. It stirs the soil more than is necessary.

The disk promotes weed growth and does not have a beneficial effect on the soil.

How Should the Stalks Be Cut?

The rolling or bump cutter does the best job for minimum tillage. The stalks are not cut up too much. The stalk shredders can be used but care should be taken that stalks aren't shredded too fine. Finely shredded stalks are not as good for erosion control.

Are Weeds a Problem With Minimum Tillage?

Weeds are usually fewer in number with minimum tillage than with conventional

planting. The till-planter and rotary moldboard lister make rows that are free of weeds. Weeds can become a problem when planting is done between the old rows. Spraying between the planted rows helps control weeds. Covering disks should not pull soil moved by sweep and trash guards back into the row.

What About Weed Sprays?

A weed spray should be used on heavy populations of weeds or plants before planting. It may be used in place of cultivation after planting.

Are Special Cultivators Needed for Minimum Tillage?

A heavy duty cultivator frame or double tool bar should be used. The recommended method is to use disk hillers on the front in place of the shovels, with sweeps in the back. The sweeps should be 18 inches across. The hillers throw soil to the plant and the sweeps clean up the center of the row.

Is Volunteer Crop a Problem?

The old crop seed that is in the row is moved out between the planted rows by the till-planter, the rotary moldboard lister, or the sweep machine. It is then easily cultivated out.

When Should the Crop Be Cultivated?

When weeds or crusting is not a problem, and with disk hillers on the cultivator, the crop should not be cultivated until it is 18-20 inches high. Cultivation can be done fast and enough soil can be thrown to the corn to cover weeds 8-10 inches tall. Larger weeds between the rows are taken care of by the sweeps.

How Many Times Is Cultivation Needed?

Normally, one cultivation is required on dryland. One cultivation and ridging is needed for irrigation.

What About the Depth of Cultivation With Hillers?

Cultivators with hillers and sweeps do not need to run as deep as conventional shovels. Speed of cultivation has some effect on the depth when using hillers. When running faster the hillers will ridge better without running too deep. Sweeps are run deep enough to get under the residue and kill the weeds.

Are Stalks A Problem When Ridging?

A clean irrigation furrow is no problem when using disks of more than 16 inches diameter for ridging. The moldboard or lister type ridgers may not do as well in long stalks. It is better and safer to use disks for ridging whether stalks have been cut or not.

Are Fertilizer Requirements Different for Minimum Tillage?

There is no difference in fertilizer requirements for crops under the minimum tillage method. With the Nebraska Till-Plant system nitrogen may be required at planting time because of nitrogen tie-up by decomposition process of residue.

What Fertilizers Are Best With Minimum Tillage?

Experiments show that the liquid and dry nitrogen fertilizers commonly sold in Nebraska are equally effective for corn when applied at the recommended rates and by the best methods.

What About Crop Yields?

The yields for minimum tillage and conventional tillage are the same. The till-plant yields are generally higher than conventional after first year of till-planting.

Is Plow-Plant a Method of Minimum Tillage?

It is but the plow stirs the soil more than necessary and takes considerable power. Soil moisture may become a problem when the soil dries to the depth of the plowing. It takes a longer time to get the planting done using a three bottom plow and one row planter. In general, plow-plant is not recommended for Nebraska.

Is Wheel Track Planting a Method of Minimum Tillage?

It is but moisture is lost to the depth of the plowing. The time of plowing and planting are critical because of compaction and baking. The tractor must be modified so wheel spacing will be the same as the row spacing. In general, this method is not recommended in Nebraska.

What About Insect and Disease in Old Residue?

There have been no observable differences in insects or disease. Research indicates the method may be beneficial in helping to control disease.